TENNESSEE DEPARTMENT OF EDUCATION
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Digital Arts & Design I

Primary Career Cluster:	Arts, A/V Technology & Communications
Consultant:	Rachel Allen, (615) 532-2835, Rachel.Allen@tn.gov
Course Code(s):	6084
Prerequisite(s):	None
Credit:	1
Grade Level:	9
Graduation Requirements:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other Arts, A/V Technology & Communication courses.
Programs of Study and Sequence:	This is the first course in the *Digital Arts & Design* program of study.
Necessary Equipment:	Refer to the Teacher Resources page.
Aligned Student Organization(s):	SkillsUSA: http://tnskillsusa.com/ Brandon Hudson, (615) 532-2804, Brandon.Hudson@tn.gov Technology Student Association (TSA): http://www.tntsa.org Amanda Hodges, (615) 532-6270, Amanda.Hodges@tn.gov
Coordinating Work-Based Learning:	If a teacher has completed work-based learning training, appropriate student placement can be offered. To learn more, please visit http://www.tn.gov/education/cte/work_based_learning.shtml.
Available Student Industry Certifications:	Adobe Certified Associate
Dual Credit or Dual Enrollment Opportunities:	There are no known dual credit/dual enrollment opportunities for this course. If interested in developing, reach out to a local postsecondary institution to establish an articulation agreement.
Teacher Endorsement(s):	230, 311, 435, 436, 475, 476, 516, 519, 520, 521,537, 538, 543, 583
Required Teacher Certifications/Training:	NOCTI Advertising & Design or Adobe Certified Expert (Photoshop or Illustrator) or ADDA Certified Digital Designer
Teacher Resources:	http://www.tn.gov/education/cte/artstech.shtml

Course Description

Digital Arts & Design I is a foundational course in the Arts, A/V Technology & Communications cluster for students interested in art and design professions. The primary aim of this course is to build a strong understanding of the principles and elements of design and the design process. Upon completion of this course, proficient students will be able to utilize industry tools to conceptualize and create

communications solutions which effectively reach targeted audiences. Students will acquire basic skills in illustration, typography, and photography. Standards in this course include career exploration, an overview of the history of design, basic business management, and legal issues. In addition, students will begin compiling artifacts for inclusion in a portfolio, which they will carry with them throughout the full sequence of courses in this program of study. Standards in this course are aligned with Tennessee State Standards for English Language Arts & Literacy in Technical Subjects, Tennessee State Standards in Mathematics, Tennessee Visual Art standards, and Tennessee Art History standards.*

Program of Study Application

This is the first course in the *Digital Arts & Design* program of study. For more information on the benefits and requirements of implementing this program in full, please visit the Arts, A/V Technology & Communications website at http://www.tn.gov/education/cte/artstech.shtml.

Course Standards

Safety

1) Demonstrate the ability to comply with personal and environmental safety practices associated with art and design applications: the use of adhesives; hand tools; machines; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.
    a. Inspect, maintain, and employ safe operating procedures with tools and equipment.
    b. Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies regarding reporting of accidents and observed hazards, and regarding emergency response procedures.
    c. Complete a written safety test with 100 percent accuracy. For equipment used in the course, complete equipment examinations with 100 percent accuracy in which the student performs an operational checkout by the instructor. Maintain a record of written safety examinations and equipment examinations.

    (TN Reading 3, 4, 9; TN Writing 4, 8, 9)

Introduction to Design

2) Investigate the role of designers in communicating ideas in society, both historically and currently, emphasizing how social, cultural, economic, and political developments are reflected in and influenced by visual messaging. Synthesize research from informational texts, including design magazines and textbooks, to create an informational artifact that illustrates how visual art and design is used as a communication tool, citing specific examples to illustrate concepts. (TN Reading 1, 2, 4, 9; TN Writing 2, 4, 8, 9; TN Visual Art 1.3, 4.1, 4.2; TN Art History 4.1)

3) Research the development of design throughout history, analyzing how advances in technology have impacted design (Gutenberg's invention of movable type, lithography, computers, and more). Citing resources from informational text, create an annotated timeline or visual graphic emphasizing significant time periods in design (such as Victorian, Arts and Crafts, Modernism, Art Deco, etc.) and the key technological advances impacting design. (TN Reading 1, 2, 3, 4, 7, 9; TN Writing 2, 5, 6, 8, 9; TN Art History 4.1)

Career Exploration

4) Identify and analyze the career pathways in art and design professions and the industries in which art and design professionals work, including but not limited to manufacturing, specialized design services, publishing, and advertising. Cite supporting evidence from multiple sources (such as interviews with design professionals retrieved from industry magazines), to produce a chart or other graphic detailing the aptitudes and training needed for at least three careers of interest. For example, outline the typical requirements needed to become a graphic designer, including personal aptitudes and secondary and postsecondary training required. Devise a tentative career plan to reach employment goals. (TN Reading 1, 2, 4, 7, 9; TN Writing 2, 6, 8, 9)

5) Compile and analyze real-time and projected labor market data from public sources such as the U.S. Bureau of Labor Statistics to explore local and regional occupational opportunities and trends in design careers. Synthesize collected data to develop an informational artifact comparing occupations by job availability, salaries, and benefits. (TN Reading 2, 4, 7; TN Writing 4, 6, 9; TN Math S-ID)

Elements and Principles of Design

6) Categorize and describe the principles of design which affect: 1) the internal relationships of a design, and 2) the design as a whole.
    a. Unity
    b. Contrast/Variety
    c. Hierarchy
    d. Dominance/Emphasis
    e. Proportion/Scale
    f. Balance
    g. Rhythm/Repetition

    Illustrate the principles of design by creating an informational artifact explaining each principle with example graphics and supporting text. (TN Reading 3, 4, 7; TN Writing 4, 8, 9; TN Visual Art 2.1; TN Art History 2.1)

7) Analyze the elements of design by evaluating their purposes and applications in a variety of design applications.
    a. Line
    b. Shape/Form
    c. Space/Size/Stability
    d. Value
    e. Color
    f. Texture
    g. Typography

    For example, label and explain the elements of design in a given book cover compared with a billboard. (TN Reading 3, 4, 7; TN Writing 9; TN Visual Art 2.1; TN Art History 2.1)

8) Research rules of composition (such as the rule of thirds) and explain how the rules govern the elements and principles of design. Write persuasively to describe the properties of a strong composition by providing examples and counterexamples and citing evidence from informational texts. (TN Reading 1, 2, 4, 5; TN Writing 1, 4, 9; TN Visual Art 2.2)

9) Explain the function of the color wheel and identify techniques that achieve desired hues, values, intensities, and color schemes for use in design. Compare and contrast additive and subtractive color systems, and relate these principles to color specification systems (such as CMYK and RGB) used in design software. (TN Reading 3, 4, 9)

10) Research the psychological characteristics of colors, comparing and contrasting the differences in warm and cool color palettes. Illustrate and describe in a written narrative how color is measured in hue, value, and intensity, and how these properties combine to produce specific psychological characteristics and illustrate themes. Produce examples that demonstrate how emotions may be influenced by the use of color in designs. (TN Reading 2, 4; TN Writing 2, 4, 9)

11) Examine color theories such as color context and contrasts of colors. Evaluate the use of various color schemes (such as complementary, tertiary, and analogous) in designs. Apply the knowledge to demonstrate basic techniques in combining colors to create designs. (TN Reading 2, 7; TN Visual Art 1.3)

12) Analyze, assess, and identify the effectiveness of design products based on the intended function of the design and the principles and elements of design used in the composition. Investigate the intent of a given design and evaluate whether the intent was met through the structure of the design. For example, create an evaluation rubric based on the elements and principles of design and use it to evaluate given design products. (TN Reading 1, 2, 4, 7, 9; TN Writing 4, 8, 9; TN Visual Art 2.1, 2.2, 2.3, 5.1, 5.2, 5.3)

Introduction to the Design Process

13) Research design processes described in textbooks, designers' professional websites, or by interviewing design professionals. (Steps may include problem identification, research, identifying the audience, brainstorming, and idea refinement.) Citing research, create a visual illustration describing the major steps to the design process for digital arts and design. (TN Reading 1, 2, 3, 4; TN Writing 4, 6, 8, 9)

14) Describe the importance of setting design goals such as determining the purpose, message, and audience for given design projects. Examine the research techniques professionals use to inform design goals and influence design outcomes. For example, describe how designers use market data to identify the audience for advertisement of a given product. (TN Reading 2, 3, 4)

Basic Illustration

15) Create two-dimensional and three-dimensional sketches, including rough and refined sketches, demonstrating shape, volume, depth, and dimension. Distinguish among common illustration techniques used in design composition such as one-point, two-point, and multi-point perspective drawings. Develop conceptual design ideas using freehand sketching. For a given design problem, generate, analyze, and refine sketches to develop design solutions. Use the sketches to create refined drawings utilizing design software. For example, create thumbnail sketches to generate ideas for a logo or advertisement. (TN Reading 2, 3, 4, 7; TN Writing 4, 6, 7, 8, 9)

16) Describe how symbols have been used and have developed throughout history. Explain how symbols communicate visual information in design. Analyze the use of symbols in pictograms, ideograms, and logos, explaining and providing examples of each in an infographic or similar artifact. (TN Reading 2, 3, 4, 7; TN Writing 9; TN Visual Art 3.1)

17) Examine a variety of well-known company logos to create a list of key characteristics that influence a logo's effectiveness. Compare the list with other resources such as textbooks and design journals, evaluating the credibility of each source. Drawing on research, plan and create an effective logo for a given mock company. Appraise the effectiveness of the resulting logo design as well as the designs of peers based on the criteria generated from the prior research. (TN Reading 2, 3, 4, 7; TN Writing 4, 7, 8, 9; TN Visual Art 3.1)

Basic Photography

18) Demonstrate basic techniques to adjust camera settings and operate a camera to capture digital images. Define and explain white balance, depth of field, and shutter speed; demonstrate procedures for properly adjusting each for a particular scene. Apply the principles of design and the rules of composition to capture photographs. (TN Reading 2, 3, 4)

19) Read and interpret instructional narratives, such as manuals or tutorials, to perform basic edits and enhancements to photographs using software, including but not limited to cropping, resizing, retouching, making selections, and using layers. Assess the extent to which each text addresses the given editing task. Demonstrate the procedures for editing raster-based imagery, both high resolution and low resolution, in CMYK and RGB, and preparing files for both print and web media. (TN Reading 2, 3, 4, 7, 8)

Introduction to Design Software

20) Demonstrate basic procedures to manage digital files. Describe file storage in memory cards and estimate the number of photographs a memory card can hold based on the resolution of the photographs and other factors. Use a scanner to create digital files. Explain appropriate resolutions for various applications such as printed and web media. Use file system folders to organize files. Utilize online file management services to backup files. (TN Reading 2, 3, 4; TN Writing 4, 6; TN Math N-Q)

21) Distinguish between the various software used for visual design, including page layout software, illustration software, photo editing software, and web publishing software. Describe and illustrate the difference between raster and vector graphics. Create a chart or infographic explaining the major types and uses of design software. Employ the appropriate software to complete assigned tasks. (TN Reading 2, 3, 4; TN Writing 4, 6, 9; TN Math N-Q)

Basic Typography

22) Categorize varieties of type, including but not limited to serif, sans serif, script, and decorative. Employ the units of measurement used to describe line spacing (leading), type size, tracking, and kerning. Apply appropriate typography to given projects, emphasizing readability and the impact on design goals. (TN Reading 2, 3, 4, 7; TN Writing 4, 6, 9; TN Visual Art 1.3)

Design Projects

23) Apply the design process to complete projects of increasing complexity and of varying applications such as print, web, film, and marketing communications. Demonstrate the ability to select and use the appropriate tools and procedures to accomplish project goals. Prepare an informative narrative to explain a design to a peer, emphasizing how the design process and the design elements and principles were applied. (TN Reading 2, 3, 4, 7; TN Writing 2, 4, 9; TN Visual Art 1.3)

24) Utilize the critique and refinement strategy as part of the design process to achieve project goals. As part of a design project, present preliminary design ideas in a way that is understandable to an audience using both visual and verbal explanations. Note constructive criticism received and use it to influence design refinement. Similarly, evaluate the work of others, drawing on design principles and project goals, to provide clear, specific, and constructive feedback. (TN Reading 2, 3, 4; TN Writing 4, 5, 6, 7, 9; TN Visual Art 1.3, 2.1, 2.2, 5.1, 5.3; TN Art History 2.1)

Ethical & Legal Issues

25) Research and interpret laws and regulations protecting intellectual property as they relate to the design industry, such as copyright laws. Explain ethical and legal conduct that provides proper credit to those whose ideas and content have been used in creating new works. Distinguish between copyrights, trademarks, infringement, and fair use. Summarize and explain guiding principles in a written or oral presentation, as though leading a training or tutorial for fellow employees. (TN Reading 1, 2, 4, 6; TN Writing 2, 4)

Business Management

26) Explore how design professionals and companies calculate profit. Relate the profitability of a business to pricing and cost. For example, create a list of expenses incurred by a freelance designer and calculate the price and amount of work that must be accomplished in order to earn profit. (TN Reading 2, 3, 4, 6, 9; TN Writing 4, 9; TN Math N-Q)

27) Describe the components of a basic contract document for design work by analyzing an example contract. Drawing on textbooks, news articles and other resources, explain the benefits of utilizing written contracts as opposed to oral agreements. (TN Reading 2, 3, 4, 6; TN Writing 4, 5, 8, 9)

Portfolio

28) Gather examples of professional portfolios from contemporary designers and photographers. List the items that are often included in a professional portfolio. In a written, visual, or oral presentation, describe the components of a professional portfolio and the benefits of maintaining one. (TN Reading 1, 4; TN Writing 2, 4, 9)

29) Compile important artifacts to create a student portfolio connecting personal career preparation to concepts learned in this course, including written descriptions of project processes and reflections on learning outcomes. (TN Writing 4, 5, 7, 9; TN Visual Art 5.1)

Standards Alignment Notes

*References to other standards include:

- TN Reading: Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects; Reading Standards for Literacy in Science and Technical Subjects 6-12; Grades 9-10 Students (page 62).
    - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standard 10 at the conclusion of the course.
- TN Writing: Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects; Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6-12; Grades 9-10 Students (pages 64-66).
    - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standards 3 and 10 at the conclusion of the course.
- TN Math: Tennessee State Standards for Mathematics; Math Standards for High School: Number and Quantity, Statistics (pages 58-83).
    - Note: The standards in this course are not meant to teach mathematical concepts. However, the concepts referenced above may provide teachers with opportunities to collaborate with mathematics educators to design project based activities or collaborate on lesson planning. Students who are engaging in activities listed above should be able to demonstrate quantitative and statistical reasoning as applied to specific technical concepts. In addition, students will have the opportunity to practice the habits of mind as described in the eight Standards for Mathematical Practice.
- TN Visual Art: Tennessee Visual Art: Visual Art standards 1.3, 2.1, 2.2, 2.3, 3.1, 4.1, 4.2, 5.1, 5.2, and 5.3 may provide additional insight and activities for educators.
- TN Visual Art History: Tennessee Visual Art History: Visual Art History standards 2.1 and 4.1 may provide additional insight and activities for educators.
- P21: Partnership for 21st Century Skills Framework for 21st Century Learning
    - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.

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Digital Arts & Design II

Primary Career Cluster:	Arts, A/V Technology & Communications
Consultant:	Rachel Allen, (615) 532-2835, Rachel.Allen@tn.gov
Course Code(s):	6086
Prerequisite(s):	*Digital Arts & Design I*
Credit:	1
Grade Level:	10
Graduation Requirements:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other Arts, A/V Technology & Communication courses.
Programs of Study and Sequence:	This is the second course in the *Digital Arts & Design* program of study.
Necessary Equipment:	Refer to the Teacher Resources page.
Aligned Student Organization(s):	SkillsUSA: http://tnskillsusa.com/ Brandon Hudson, (615) 532-2804, Brandon.Hudson@tn.gov Technology Student Association (TSA): http://www.tntsa.org Amanda Hodges, (615) 532-6270, Amanda.Hodges@tn.gov
Coordinating Work-Based Learning:	If a teacher has completed work-based learning training, appropriate student placement can be offered. To learn more, please visit http://www.tn.gov/education/cte/work_based_learning.shtml.
Available Student Industry Certifications:	Adobe Certified Associate
Dual Credit or Dual Enrollment Opportunities:	There are no known dual credit/dual enrollment opportunities for this course. If interested in developing, reach out to a local postsecondary institution to establish an articulation agreement.
Teacher Endorsement(s):	230, 311, 435, 436, 475, 476, 516, 519, 520, 521,537, 538, 543, 583
Required Teacher Certifications/Training:	NOCTI Advertising & Design or Adobe Certified Expert (Photoshop or Illustrator) or ADDA Certified Digital Designer
Teacher Resources:	http://www.tn.gov/education/cte/artstech.shtml

Course Description

Digital Arts & Design II is a course that builds on the basic principles and the design process learned in the introductory *Digital Arts & Design* course. Upon completion of this course, proficient students will be able to perform advanced software operations to create photographs and illustrations of increasing complexity. Students will employ design principles and use industry software to create layouts for a

variety of applications. Standards in this course also include an overview of art and design industries, career exploration, and business management. In addition, students will begin compiling artifacts for inclusion in a portfolio, which they will carry with them throughout the full sequence of courses in this program of study. Standards in this course are aligned with Tennessee State Standards for English Language Arts & Literacy in Technical Subjects, Tennessee State Standards in Mathematics, Tennessee Visual Art standards, and Tennessee Art History standards.*

Program of Study Application

This is the second course in the *Digital Arts & Design* program of study. For more information on the benefits and requirements of implementing this program in full, please visit the Arts, A/V Technology & Communications website at http://www.tn.gov/education/cte/artstech.shtml.

Course Standards

Safety

1) Demonstrate the ability to comply with personal and environmental safety practices associated with art and design applications: the use of adhesives; hand tools; machines; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.
    a. Inspect, maintain, and employ safe operating procedures with tools and equipment.
    b. Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies regarding reporting of accidents and observed hazards, and regarding emergency response procedures.
    c. Complete a written safety test with 100 percent accuracy. For equipment used in the course, complete equipment examinations with 100 percent accuracy in which the student performs an operational checkout by the instructor. Maintain a record of written safety examinations and equipment examinations.

    (TN Reading 3, 4, 9; TN Writing 4, 8, 9)

The Art & Design Industry

2) Analyze how art and design professionals interact with others within industry. Perform a case study of a company to evaluate the role of art and design professionals within the company. Create an oral, written, or visual presentation of findings. For example, investigate a package designer's interactions with engineers, managers, and assembly crews in a manufacturing company to create package designs for a product. (TN Reading 1, 2, 3, 4, 5, 7; TN Writing 2, 9)

3) Develop a research paper, media production, or visual display demonstrating the impact of technology on the careers of art and design professionals, including the impact on technical work and business management. Write persuasively to describe the personal traits and skills needed for professionals in the field as technology advances, citing an example of an emerging or future technology. (TN Reading 2, 6, 8; TN Writing 1, 4, 6, 8, 9)

Career Exploration

4) Research postsecondary institutions (i.e., colleges of applied technology, community colleges, and four-year universities) in Tennessee and other states that offer art and design programs. Write an informative paper or develop an infographic identifying admissions criteria, the postsecondary programs of study, and the secondary courses that will prepare individuals to be successful in an art or design program. Evaluate the tentative career plan developed in the introductory course in light of these findings, and update the career plan to reflect any new discoveries, citing evidence from the research. (TN Reading 1, 2, 3, 5; TN Writing 4, 7, 9)

Principles of Photography

5) Analyze the relationship between shutter speeds, f-stop, and ISO settings in determining the exposure of an image. Synthesize information from instructional manuals and other resources to appropriately adjust manual camera settings including shutter, ISO, f-stop controls, and white balance to take photographs for a range of settings and content. (TN Reading 1, 3, 4)

6) Describe the purposes and functions of lighting techniques such as strobe lighting, bounce flash, and diffusing devices from sources such as textbooks, photography blogs, or instructional manuals. Utilize proper lighting techniques to take photographs for a range of settings and content. (TN Reading 1, 4)

7) Develop photo editing skills by utilizing software operations of advancing complexity to modify and enhance images. For example, use layers to manipulate parts of an image independently or remove objects from an image. Explain the steps required to perform a given photo editing technique in a presentation such as an instructional video or text with supporting graphics. (TN Reading 1, 2, 3, 5; TN Writing 2, 4, 9)

8) Document photography activity in a photography journal or portfolio. Use proper measurements and terminology to record camera settings and lighting techniques when capturing photographs in a variety of environments. Include any editing techniques performed using software and the resulting photographs. Reflecting on the results, summarize strategies for taking photographs in at least three different environments in a written narrative, citing evidence from supporting texts as well as the finished product. (TN Reading 1, 2; TN Writing 4, 6, 9)

Principles of Illustration

9) Create and modify vector illustrations of increasing complexity. Apply the principles of design and utilize advanced software tools such as live trace, creating gradients, transforming objects, and more. (TN Reading 3, 4; TN Visual Art 2.1; TN Art History 2.1)

Visual Layouts

10) Use publishing software to create single- and multi-page layouts. Apply and build on compositional techniques learned in the introductory course, including the rule of thirds. Describe the elements of a page layout, including headings, body text, illustrations, frames,

color schemes, and white space. Identify and use layout tools such as a grid system, guides, margins, columns, gutters, and rows. Distinguish among measurement and layout terminology such as picas, bleeds, and slugs. Based on a project's theme and the medium of the final product, create comprehensive layouts properly integrating page layout elements, design principles, and compositional techniques. (TN Reading 3; TN Writing 6, 9; TN Math N-Q, G-MG; TN Visual Art 2.1; TN Art History 2.1)

11) Apply mathematics concepts and measurement techniques to design and finish layouts. Concepts should include, but are not limited to:
    a. Determining and applying the equivalence between fractions and decimals. For example, convert a decimal to a fraction to prepare a unit for measurement on a fractional scale to the precision of 1/16 of an inch.
    b. Working with units such as feet, inches, meters, centimeters, millimeters, and picas. For example, convert a dimension from centimeters to inches.
    c. Performing proportionate reasoning to estimate quantities, such as determining the appropriate scale of an image for a given sheet size.

    (TN Reading 3; TN Math N-Q, G-MG)

12) Apply principles of typography as they relate to layout and page composition in order to appropriately use various forms of type when designing layouts. Employ typography tools to manipulate text within layouts such as threading and flowing text frames. Further, investigate the use of typography as an expressive form. For example, use text as an image or combine type and image into a cohesive form. (TN Reading 3, 4; TN Writing 6)

13) In teams, use software to create complex layouts, including multiple-page layouts, large displays, and/or product designs (i.e., for corporate branding packages, product-line packaging and marketing, and more). Demonstrate consistency of style throughout the design package while managing the storage of complex files within the selected software environment. (TN Reading 3, 4; TN Writing 4, 6)

14) Understand the connection between digital layouts and final products, such as understanding the difference between the screen color and the print color. Prepare layouts for production by testing and refining files using pre-flight procedures. Make final products in varying formats, including but not limited to layouts printed on paper and layouts published digitally. (TN Reading 3, 4; TN Writing 6)

Projects

15) Employ research methods when planning a design project, including data collection and analysis. Synthesize research to present appropriate precedents for the development of a project and articulate logical rationale for the use of chosen precedents. Create a detailed presentation or written report, citing evidence from research, which summarizes design decisions in light of research findings. For example, conduct a survey to determine the target audience for a given company branding package, and select colors and symbols based on the target audience. (TN Reading 1, 2, 4, 6, 9; TN Writing 2, 4, 6, 9)

16) Apply the design process to complete projects of increasing complexity and of varying applications such as print, web, film, and marketing communications. Demonstrate the ability to

select and use the appropriate tools and procedures to accomplish project goals. Prepare a persuasive narrative to explain the design to a client, communicating the project in such a way that is understandable to the audience. (TN Reading 3, 4, 5, 7; TN Writing 1, 4; TN Math N-Q, G-MG)

17) Utilize the critique and refinement strategy as part of the design process to achieve project goals. As part of a design project, present preliminary design ideas in a way that is understandable to an audience using both visual and verbal explanations. Note constructive criticism received and use it to influence design refinement. Similarly, evaluate the work of others, drawing on design principles and project goals, to provide clear, specific, and constructive feedback. (TN Reading 2, 3, 4; TN Writing 4, 5, 6, 7, 9; TN Visual Art 1.3, 2.1, 2.2, 5.1, 5.3; TN Art History 2.1)

18) Complete a design project in a specific application (i.e., print, web, film, marketing, or other design communications) using multiple software formats. Referencing supporting evidence such as industry standards, select the appropriate software for each specific task and efficiently manage file content. Convert and export files as needed for the given application. For example, place photographs and illustrations in publishing software by appropriately linking the files. (TN Reading 1, 2, 3, 5; TN Writing 4, 7, 9)

19) Explore time management techniques utilized by professionals from case studies or professional organizations, noting key habits and best practices of freelance designers as compared with their salaried peers. Create and implement a work schedule, timeline, and budget for completing a given project. (TN Reading 1, 2, 3; TN Writing 2, 4, 7, 9)

Business Management

20) Analyze the relationship and responsibilities of various parties involved in a business contract. Write a basic contract for design work, such as a graphic designer's contract with a new business to create a marketing package. Emulate a design professional by explaining the contract to a mock client. (TN Reading 2, 3, 4, 5; TN Writing 2, 4)

Portfolio

21) Update materials from coursework to add to the portfolio begun in *Digital Arts & Design I*, including artifacts that demonstrate ability to use industry-specific technology. Continually reflect on coursework experiences and revise and refine the career plan generated in the introductory course. Include written descriptions of project types and learning outcomes. (TN Writing 4, 5, 7, 9; TN Visual Art 5.1)

Standards Alignment Notes

*References to other standards include:

- TN Reading: Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects; Reading Standards for Literacy in Science and Technical Subjects 6-12; Grades 9-10 Students (page 62).

    - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standard 10 at the conclusion of the course.
- TN Writing: Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects; Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6-12; Grades 9-10 Students (pages 64-66).
    - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standards 3 and 10 at the conclusion of the course.
- TN Math: Tennessee State Standards for Mathematics; Math Standards for High School: Number and Quantity, Geometry (pages 58-83).
    - Note: The standards in this course are not meant to teach mathematical concepts. However, the concepts referenced above may provide teachers with opportunities to collaborate with mathematics educators to design project based activities or collaborate on lesson planning. Students who are engaging in activities listed above should be able to demonstrate quantitative and geometric reasoning as applied to specific technical concepts. In addition, students will have the opportunity to practice the habits of mind as described in the eight Standards for Mathematical Practice.
- TN Visual Art: Tennessee Visual Art: Visual Art standards 1.3, 2.1, 2.2, 3.1, 4.1, 4.2, 5.1, 5.2, and 5.3 may provide additional insight and activities for educators.
- TN Visual Art History: Tennessee Visual Art History: Visual Art History standard 2.1 may provide additional insight and activities for educators.
- P21: Partnership for 21st Century Skills Framework for 21st Century Learning
    - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.

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Digital Arts & Design III

Primary Career Cluster:	Arts, A/V Technology & Communications
Consultant:	Rachel Allen, (615) 532-2835, Rachel.Allen@tn.gov
Course Code(s):	6087
Prerequisite(s):	*Digital Arts & Design I*, *Digital Arts & Design II*
Credit:	1-2 (See Recommended Credits Below)
Grade Level:	11-12
Graduation Requirements:	This course satisfies one to two of three credits required for an elective focus when taken in conjunction with other Arts, A/V Technology & Communications courses.
Programs of Study and Sequence:	This is the third course in the *Digital Arts & Design* program of study.
Necessary Equipment:	Refer to the Teacher Resources page.
Aligned Student Organization(s):	SkillsUSA: http://tnskillsusa.com/ Brandon Hudson, (615) 532-2804, Brandon.Hudson@tn.gov Technology Student Association (TSA): http://www.tntsa.org Amanda Hodges, (615) 532-6270, Amanda.Hodges@tn.gov
Coordinating Work-Based Learning:	If a teacher has completed work-based learning training, appropriate student placement can be offered. To learn more, please visit http://www.tn.gov/education/cte/work_based_learning.shtml.
Available Student Industry Certifications:	Adobe or American Design Drafting Association
Dual Credit or Dual Enrollment Opportunities:	There are no known dual credit/dual enrollment opportunities for this course. If interested in developing, reach out to a local postsecondary institution to establish an articulation agreement.
Teacher Endorsement(s):	230, 311, 435, 436, 475, 476, 516, 519, 520, 521,537, 538, 543, 583
Required Teacher Certifications/Training:	NOCTI Advertising & Design or Adobe Certified Expert (Photoshop or Illustrator) or ADDA Certified Digital Designer
Teacher Resources:	http://www.tn.gov/education/cte/artstech.shtml

Course Description

Digital Arts & Design III is the third course in the Digital Arts & Design program of study. Applying design skills developed in prior courses, students will expand their creative and critical thinking skills to create comprehensive multimedia projects and three-dimensional designs. Upon completion of this course, proficient students will be able to use industry-standard software to create multimedia projects, web

pages, three-dimensional models, and animations. Students will utilize research techniques to plan and enhance project outcomes. Standards in this course also include professionalism and ethics, career exploration, and business and project management. In addition, students will begin compiling artifacts for inclusion in a portfolio, which they will carry with them throughout the full sequence of courses in this program of study. Standards in this course are aligned with Tennessee State Standards for English Language Arts & Literacy in Technical Subjects, Tennessee State Standards in Mathematics, Tennessee Visual Art standards, and Tennessee Art History standards.*

Program of Study Application

This is the third course in the *Digital Arts & Design* program of study. Flexibility is built in to offer this course for either one or two credits, depending on school capacity and teacher background. Whether offered for one credit or two credits, this course leads to a fourth-level *Applied Arts Practicum* course in which students apply the skills learned here toward the completion of an in-depth, semester- or year-long project. For more information on the benefits and requirements of implementing this program in full, please visit the Arts, A/V Technology & Communications website at http://www.tn.gov/education/cte/artstech.shtml.

Recommended Credit

If all standards in the course are covered, the course is recommended for two credits. If only one credit is to be offered, two options are recommended. Option A focuses more on multimedia and web applications, while Option B is tailored for programs with a specific interest in or capacity for teaching animation.

1 Credit - Option A

Content	Standards
Safety	1
Professionalism & Ethics in Design	2, 3
Career Exploration	4
Multimedia	5, 6
Web Applications	7, 8, 9
Three-Dimensional Graphics	10, 11
Research Project	21
Design Projects	22, 23, 24
Business Management	25, 26
Portfolio	27

1 Credit - Option B

Content	Standards
Safety	1
Professionalism & Ethics in Design	2, 3
Career Exploration	4
Three-Dimensional Graphics	10, 11
Animation	12, 13, 14, 15 16, 17, 18, 19, 20
Research Project	21
Design Projects	22, 23, 24
Business Management	25, 26
Portfolio	27

Course Standards

Safety

1) Demonstrate the ability to comply with personal and environmental safety practices associated with art and design applications: the use of adhesives; hand tools; machines; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.
    a. Inspect, maintain, and employ safe operating procedures with tools and equipment.
    b. Adhere to responsibilities, regulations, and Occupational Safety & Health Administration (OSHA) policies regarding reporting of accidents and observed hazards, and regarding emergency response procedures.
    c. Complete a written safety test with 100 percent accuracy. For equipment used in the course, complete equipment examinations with 100 percent accuracy in which the student performs an operational checkout by the instructor. Maintain a record of written safety examinations and equipment examinations.

    (TN Reading 3, 4; TN Writing 4)

Professionalism and Ethics

2) Collaboratively develop a professionalism rubric for professional attributes required within art and design professions. Research job descriptions, career information, and online job boards such as general employability skills and character traits most often mentioned or desired for digital art and design professionals. For each item on the rubric, define the characteristic, state why it is important for professionals working in these fields, and list performance indicators for the skill. Possible skills include:
    a. Creative design skills
    b. Ethical business practices
    c. Honesty
    d. Respect
    e. Communication
    f. Responsibility

    (TN Reading 1, 4; TN Writing 2, 4, 8)

3) Examine current and emerging ethical and legal issues related to the digital art and design industry (e.g., copyright, font licensing, piracy, photo manipulation, sustainability). Choose one such issue and develop a claim about its impact on society and the responsibility of the digital art and design professional. (TN Reading 7, 8; TN Writing 1, 4, 9)

Career Exploration

4) Research the range of credentials one can earn with advanced study of art and design at the postsecondary level (i.e., technical certification, BA, BS, MFA, etc.). Investigate both in-state and out-of-state postsecondary programs in a variety of digital art and design fields, including but not limited to graphic design, photography, industrial design, digital media, animation, and more. Synthesize research conducted in previous Digital Arts & Design courses to update the portfolio career plan to achieve post-high school goals. (TN Reading 5, 7, 9; TN Writing 2, 4, 6, 8)

Multimedia

5) Drawing on research from industry journals and similar publications, analyze how the principles of design converge with digital technology and imagery in motion graphics and multimedia. Select a multimedia product and explain in a visual, oral, or written presentation how the principles of design work in harmony with technical skills such as creating visual layouts, illustrations, and photographs to achieve the final product. (TN Reading 1, 2, 4; TN Writing 2, 6, 9; TN Visual Art 2.1)

6) Apply the design process to complete advanced multimedia projects of increasing complexity for a range of applications such as print, web, film, and marketing communications. Demonstrate the ability to select and use the appropriate tools and procedures to accomplish project goals. Gather and arrange image, audio, and media for incorporation into comprehensive media projects. For example, create an interactive presentation that a client could use as a marketing and educational tool for potential customers. (TN Reading 2, 5; TN Writing 4; TN Math N-Q, G-MG)

Web Applications

7) Research design constraints affecting the design of graphics and layouts for web devices, including computers and mobile devices. Describe how design processes for the web differ from design processes for print or product creation. Evaluate and critique webpages based on the principles and elements of design and other considerations related to user friendliness and navigability. (TN Reading 1, 5, 9; TN Visual Art 2.2, 5.1, 5.3)

8) Apply illustration, photography, and layout skills to create interactive media for use on the web. For example, create a navigation bar, logo, or banner to incorporate in a web page. (TN Reading 3, 4)

9) Describe the steps involved in creating webpages. Use a content management system or web design software to create a simple informative webpage. Apply the principles of design and composition. Prepare images and illustrations in the proper format for use on the web. For example, as part of a design package for a client, create a mock-up of a webpage incorporating color schemes and graphics that coordinate with the design package. (TN Reading 3, 4; TN Writing 4; TN Visual Art 2.1)

Three-Dimensional Graphics

10) Research and compile examples of digital three-dimensional modeling and graphics created by design professionals in a range of industries, such as entertainment, health sciences, architecture, engineering, aerospace, advertising, and graphic design. In a visual display such as an infographic, evaluate examples from at least five industries, citing the sources used. (TN Reading 1, 2, 7, 9; TN Writing 2, 6, 7, 9)

11) Perform multistep procedures in industry software to create three-dimensional models of increasing complexity. Apply design principles and software tools to develop the design, including but not limited to:
    a. Applying surface materials
    b. Creating a background environment
    c. Adding lighting features to create shading and shadow effects
    d. Positioning cameras to set-up scenes
    e. Rendering the models to create finished products
    f. Generating videos of three-dimensional models such as walkthroughs or flyovers

    (TN Reading 3, 4; TN Visual Art 2.1)

Animation

12) Synthesize research from informational texts, including industry magazines and online resources, to create an annotated timeline or visual graphic emphasizing significant time periods, technological advances, and key figures in animation. (TN Reading 2, 7; TN Writing 2, 9)

13) Research and report on the principles of animation. Examine movies, cartoons, or other animations to identify applications of the principles of animation. As a class, create a presentation explaining the principles of animation by citing resources and identifying examples in works of animation. (TN Reading 1, 2, 3, 4, 7, 9; TN Writing 2, 5, 6, 8, 9)

14) Describe the animation process, outlining the steps involved in planning, creating, and editing an animation. Drawing on research, perform multistep procedures to develop a three-dimensional animation. Steps should include:
    a. Brainstorming to develop an idea
    b. Conducting research to determine the target audience
    c. Conducting research to develop visual ideas
    d. Producing sketches of the presentation
    e. Creating an environment for the animation
    f. Applying the principles of animation toward the completion of a working animation

    (TN Reading 1, 2, 5; TN Writing 2)

15) Create a storyboard to develop animation concepts. The storyboard should present visual elements of the animation, illustrations of the sequence of actions, and major themes and ideas. Present the storyboard to peers for evaluation. Revise and refine the storyboards based on constructive feedback. (TN Reading 3, 4; TN Writing 4, 5, 6)

16) Apply three-dimensional modeling skills to create the elements of an animation, including creating, modifying, and manipulating polygonal objects and creating and applying surface textures. (TN Reading 3, 4)

17) Analyze the properties and uses of different types of lighting for an animation scene, including three point lighting, animated lighting, indirect and direct lighting, and environmental lighting. Create a chart or visual display to compare and contrast each type. Use software tools to apply appropriate lighting to the scene, utilizing the principles of design and animation. (TN Reading 1, 2, 4, 9; TN Writing 2, 4, 9; TN Visual Art 2.1)

18) Follow multistep procedures to use cameras, including animated cameras, to create animations. Demonstrate the ability to bring conceptual ideas from the storyboards to fruition. (TN Reading 3)

19) Utilize animation software to understand and apply the mechanics of animation. Apply basic software techniques to create animations. Techniques include the following:
    a. Create and modify key frames and poses
    b. Change an objects state or position over time
    c. Establish an object's speed
    d. Move an object along a path
    e. Apply basic rigging to a model

    For example, utilize software tools to simulate a mechanical cycle such as a ball dropping and bouncing. (TN Reading 3, 4)

20) Apply various animation effects when working on animation projects, including particle systems, environmental simulation (wind, gravity, time), and other effects. Use appropriate rendering settings to render a sequence of frames. Save the file in appropriate formats for given applications and explain why a particular format is most acceptable for the selected application and audience, such as the use of an .swf file on a webpage. (TN Reading 3, 4; TN Writing 4, 9)

Research Project

21) In preparation for a design project, perform in-depth research to investigate the context of the project's use and the potential users of the project. Create an informative essay describing the context of the design, citing both qualitative and quantitative research. For example, for a three-dimensional animation of a product's design, make a claim for the targeted audience and the environment in which the product will be used, citing specific textual evidence to support the claim. (TN Reading 1, 2, 4, 6, 9; TN Writing 2, 4, 8, 9)

Design Projects

22) Apply the design process to complete projects of increasing complexity, combining multiple media to communicate, market, or advertise across different platforms, including print, web, film, and other digital forums, in order to maximize audience reach and reinforce message. Describe why multiple media are needed to accomplish project goals; specifically, justify why a web-based format is appropriate for one audience whereas a print format is more appropriate for another. Demonstrate the ability to select and use the appropriate tools, procedures, and project management techniques to accomplish project goals. Prepare a persuasive narrative to explain the project to a client, communicating the project in such a way that is understandable to the audience. (TN Reading 3, 4, 5, 7; TN Writing 1, 4; TN Math N-Q, G-MG)

23) Utilize the critique and refinement strategy as part of the design process to achieve project goals. As part of a design project, present preliminary design ideas in a way that is understandable to an audience using both visual and verbal explanations. Note constructive criticism received and use it to influence design refinement. Similarly, evaluate the work of others, drawing on design principles and project goals to provide clear, specific, and constructive feedback. (TN Reading 2, 3, 4; TN Writing 4, 5, 6, 7, 9; TN Visual Art 1.3, 2.1, 2.2, 5.1, 5.3; TN Art History 2.1)

24) Complete a project using multiple software. Determine the appropriate software for each specific task and efficiently manage file content. Convert and export files as needed for the given application. For example, import photographs and illustrations into three-dimensional modeling software by appropriately linking the files. (TN Reading 1, 2, 3, 5; TN Writing 4, 7, 9)

Business Management

25) Analyze the components of a professional design proposal. Write an informative text describing the purpose of each element of a proposal. Include strategies for the designer to use to generate the information contained in each section. (TN Reading 4, 5; TN Writing 2, 9)

26) Use an online editing tool to develop a professional proposal for a specific project. Use a variety of sources to gather data, cite each source, and briefly describe why the chosen source is reliable. (TN Reading 1, 7, 8; TN Writing 2, 6, 8)

Portfolio

27) Update the portfolio to reflect the cumulative total of all projects undertaken across the program of study. Compile information, sketches, photographs, illustrations, layouts, and design projects from each course. Include artifacts that demonstrate ability to use industry-specific technology. Select projects from course work that showcase qualifications as a design student. Upon completion of this course, the following artifacts will reside in the student portfolio:
    a. Career plan
    b. Professionalism rubric
    c. Example designs showing best work from each course

    (TN Reading 1, 4, 7; TN Writing 2, 4)

Standards Alignment Notes

*References to other standards include:

- TN Reading: Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects; Reading Standards for Literacy in Science and Technical Subjects 6-12; Grades 11-12 Students (page 62).
    - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standards 10 at the conclusion of the course.
- TN Writing: Tennessee State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects; Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects 6-12; Grades 11-12 Students (pages 64-66).
    - Note: While not directly aligned to one specific standard, students who are engaging in activities outlined above should be able to also demonstrate fluency in Standards 3 and 10 at the conclusion of the course.
- TN Math: Tennessee State Standards for Mathematics; Math Standards for High School: Number and Quantity, Geometry, Statistics (pages 58-83).
    - Note: The standards in this course are not meant to teach mathematical concepts. However, the concepts referenced above may provide teachers with opportunities to

collaborate with mathematics educators to design project based activities or collaborate on lesson planning. Students who are engaging in activities listed above should be able to demonstrate quantitative, geometric, and statistical reasoning as applied to specific technical concepts. In addition, students will have the opportunity to practice the habits of mind as described in the eight Standards for Mathematical Practice.

- TN Visual Art: Tennessee Visual Art: Visual Art standard 1.3, 2.1, 2.2, 3.1, 4.1, 4.2, 5.1, 5.2, and 5.3 may provide additional insight and activities for educators.
- TN Visual Art History: Tennessee Visual Art History: Visual Art History standard 2.1 may provide additional insight and activities for educators.
- P21: Partnership for 21st Century Skills Framework for 21st Century Learning
    - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.